

EXHIBIT 3

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ORACLE AMERICA, INC.

Plaintiff,

v.

GOOGLE, INC.

Defendant.

Case No. 3:10-cv-03561-WHA

**OPENING EXPERT REPORT OF DR. OWEN ASTRACHAN
ON TECHNICAL ISSUES RELATING TO FAIR USE**

**CONTAINS HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY MATERIAL
SUBJECT TO PROTECTIVE ORDER**

TABLE OF CONTENTS

I. INTRODUCTION.....	1
A. Case Background	1
B. Professional Qualifications	2
C. Documents and Information Considered	3
II. BRIEF SUMMARY OF MY OPINIONS.....	3
III. LEGAL STANDARDS.....	6
IV. TECHNICAL BACKGROUND	8
A. Programming Languages Generally	8
B. APIs Generally.....	14
1. What is an API?	14
2. What is the purpose of an API?	17
3. How do programmers use APIs?	20
4. What are the components of a method declaration?	21
5. How are APIs organized?	25
6. What is the distinction between an API and its implementation?	29
7. Basic Example of a Java Method Usage.....	33
C. The Java Platform	34
1. Java Standard Edition (SE).....	37
2. Java Enterprise Edition (EE).....	38
3. Java Micro Edition (ME)	39
D. The 37 Java API Packages.....	40
V. ANDROID	42
A. Android Platform	42
1. Linux Kernel	44
2. Dalvik Virtual Machine / Android Runtime	45
3. Core Libraries	45

4. Libraries	48
5. Application Framework	49
6. Applications	50
B. Android Distribution	50
VI. ANALYSIS OF FAIR USE FACTORS FOR DECLARATIONS IN THE 37 API PACKAGES	51
A. The Purpose and Character of the Use.....	51
B. The Nature of the Copyrighted Work	59
1. The declarations in the 37 API packages are closely tied to using the Java programming language for a mobile smartphone platform.....	60
2. The rules and naming conventions in the Java Language Specification constrain the choices for Java API element names and how they are organized.....	65
3. The names of the 37 API packages are closely tied to their function.....	68
4. The names of the classes and methods are also closely tied to their function.	72
5. Many API elements are drawn from the public domain and are not original to Java...	80
C. The Amount and Substantiality of the Portion Taken	88
D. The Effect of the Use Upon the Potential Market.....	104
E. Other Considerations Related to Fair Use	110
1. Other implementations of Java SE.....	111
2. Sun’s and Oracle’s implementation of APIs from others.	113
a) Sun implemented and distributed APIs from previous generations of spreadsheets as part of Staroffice and Openoffice.org.	113
b) Sun implemented and distributed APIs from Linux as part of Solaris.....	117
c) Oracle implemented and distributed APIs from IBM as part of the Oracle Database Server.....	122
3. Additional Oracle projects that support or encourage Android	124
VII. CONCLUSION	124

running large-scale, multi-tiered, scalable, reliable, and secure network applications.”

OAGOOGL0024805825 at -35 (Oct. 4, 2006); OAGOOGL0025057076 at -89 (May 29, 2009); Your First Cup: An Introduction to the Java™ EE Platform at 12 (April 2012) (*available at* <http://docs.oracle.com/javaee/6/firstcup/doc/firstcup.pdf>); <http://docs.oracle.com/javaee/6/firstcup/doc/gkhoy.html>.

103. Unlike Java SE, Java EE is meant for server environments that provide more in the way of computing resources than typical desktop and embedded environments. Befitting this more complex environment, Java EE provides additional APIs on top of those provided by Java SE. The Java EE platform adds roughly 100 packages to a set of packages that are part of Java SE. These packages provide services for interacting with programs over the web, for client/server programs running over networks, for processing transactions, for sending or receiving email, and for other services and processes that require large-scale, networked programs.

3. Java Micro Edition (ME)

104. Befitting its name, Java ME is relatively small and provides only a subset of the Java SE APIs. As Oracle explains: “The Java ME platform provides an API and a small-footprint virtual machine for running Java programming language applications on small devices, like mobile phones. The API is a subset of the Java SE API, along with special class libraries useful for small device application development.” OAGOOGL0024805825 at -35 (Oct. 4, 2006); OAGOOGL0025057076 at -89 (May 29, 2009); Your First Cup: An Introduction to the Java™ EE Platform at 12 (April 2012) (*available at* <http://docs.oracle.com/javaee/6/firstcup/doc/firstcup.pdf>); <http://docs.oracle.com/javaee/6/firstcup/doc/gkhoy.html>.

105. Notably, Java ME includes only a very limited number of packages (~10, depending on the profile) as compared to Java SE (which has ~160 APIs in Java 1.5/5, and roughly 200 APIs in Java 7).

106. Although it was used in some mobile phones, Java ME never provided a full-stack smartphone platform for mobile phone and/or application developers. This is addressed in more detail below.

D. The 37 Java API Packages

107. I understand that Oracle is claiming that Google's implementation of the Java API specifications for the following packages does not constitute fair use:

java.awt.font

java.beans

java.io

java.lang

java.lang.annotation

java.lang.ref

java.lang.reflect

java.math

java.net

java.nio

java.nio.channels

java.nio.channels.spi

java.nio.charset

java.nio.charset.spi

java.security

alternatively, a Berkeley Software Distribution (“BSD”) open-source license. *See* <https://webkit.org/licensing-webkit/>.

131. Google also recently released a new implementation of the 37 API packages using the OpenJDK code base, which is licensed under the GPL-2.0 with Classpath Exception license (“GPL-2.0-CE license”). I understand that the other core libraries, including an additional 14 Java SE API packages in which Oracle does not assert infringement, as well as the 112 other Android packages developed by Google, will continue to be licensed under the Apache 2.0 license.

132. In short, Google mixes and matches different open source licenses for different Android components, depending on, among other things, the source of the underlying code and Google’s declared open-source licensing preferences.

VI. ANALYSIS OF FAIR USE FACTORS FOR DECLARATIONS IN THE 37 API PACKAGES

A. The Purpose and Character of the Use

133. In my opinion, Google’s use of the method declarations in the 37 API packages gave them a new expression, meaning, or message so as to create something new, with a further purpose or different character than Java SE. Google’s use of the method declarations in the 37 API packages as part of the larger, mobile-targeted Android platform is substantially different from Java SE, which—as discussed above—was directed to applications for desktop computers and servers (as well as demanding embedded environments). As such, Android’s use of the method declarations from the 37 API packages from Java SE was highly transformative because Google made substantial and important changes to the original work.

134. As discussed above, Java SE provides a broad set of APIs, befitting an environment with sufficient power, storage, and computing power. That well describes a

desktop computer or server (as well as common “demanding” embedded systems—e.g., cars, ATMs, and point-of-sale devices), to which Sun/Oracle targeted Java SE (as discussed above). Java ME and EE are also consistent with their respective intended usages (as also discussed above).

135. Android uses the method declarations from the 37 API packages in a very different context from Java SE (as well as from Java EE and Java ME), because Android was designed for use in “smartphones”—mobile devices with touch-screen interfaces and a framework for running applications. Furthermore, in comparison to the environments for which Java SE was tailored—desktops and servers (as well as demanding embedded environments)—mobile devices generally have less power, processor speed, and memory. They also have different input/output characteristics, including, for example, smaller displays with touch-screen capability, and rely on different networking capabilities (*e.g.*, cellular connections). Accordingly, many of the APIs in Java SE (or EE, for that matter) are not well-suited or appropriate for smartphones, whereas the Java ME APIs were not sufficiently robust to support a full smartphone platform. As a result, until Android transformed the 37 Java API packages, they had never been successfully used to support a full-stack smartphone platform.

136. As discussed above, Google built a variety of APIs for Android that are specific to smartphone devices (*e.g.*, APIs for cameras, location awareness/GPS, audio/video playback and recording, and display features). *See also generally* Package Index (*available at* <http://developer.android.com/reference/packages.html>); Android API Guides (*available at* <http://developer.android.com/guide/index.html>).

137. Furthermore, the 37 Java API packages that have been implemented by Google for Android are a small part of the overall Android system, both in terms of the functionality they

command was used in early demonstrations of the Oracle database (*see* “Oracle SQL: The Essential Reference,” David C. Kreines (2000), p. xiv and Chapter 1, “Elements of SQL”).

3. Additional Oracle projects that support or encourage Android

306. From the moment it announced plans to acquire Sun, Oracle publicly encouraged Android. In June 2009, Oracle’s then-CEO Larry Ellison publicly praised Google at the largest Java developer conference in the world, stating that Oracle was “flattered” by Android and expected to “see lots and lots of Java devices” “from our friends at Google.” TX 2939.

307. Oracle has also encouraged its own customers or potential customers to use Android by creating and promoting products to run on Android phones. For example, Oracle promoted efforts to port its Java FX product to Android phones. *See* RT 1996:17-1997:25; TX 3103. Java FX is a user interface framework product licensed by Oracle. Smith Dep. Tr. at 64:18-23; *see also* DX 1321. Oracle also designed its Application Developer (“ADF”) and Mobile Application Framework (“MAF”) to enable its Java products to run on Android phones. Smith Dep. Tr. at 247:23-249:22; 251:2-254:10; *see also* DX 1321. Additionally, Oracle has created applications to run on Android phones, and it makes those applications available on Google Play. *See* <https://play.google.com/store/search?q=Oracle&c=apps&hl=en> (last visited January 8, 2016).

VII. CONCLUSION

308. I reserve the right to update and refine my opinions and analyses in light of any additional materials or information that may come to my attention in the future, including additional contentions by Oracle as well as any rulings issued by the Court in this case. I also reserve the right to supplement my opinions and analyses as set forth in this report in light of any expert reports submitted by Oracle and in light of any deposition or trial testimony of Oracle’s experts.

HIGHLY CONFIDENTIAL – OUTSIDE ATTORNEYS’ EYES ONLY

Executed on the 8th of January, 2016 in Durham, NC.

A handwritten signature in black ink, appearing to read 'O. Astrachan', written over a horizontal line.

Dr. Owen Astrachan